

**Economic and Social Council**Distr.: General
19 February 2015

Original: English

Economic Commission for Europe**Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on General Safety Provisions****108th session**

Geneva, 4 May–8 May 2015

Item 6 of the provisional agenda

Regulation No. 58 (Rear underrun protection)**Proposal for the 03 series of amendments to Regulation No. 58
(Rear underrun protection)****Submitted by the expert from Germany ***

The text reproduced below was produced by the expert from Germany to introduce more stringent requirements for rear underrun protection devices. This proposal supersedes ECE/TRANS/WP.29/GRSG/2013/27 (see report ECE/TRANS/WP.29/GRSG/84, para. 33) and takes into account the changes introduced by GRSG-107-39 (see report ECE/TRANS/WP.29/GRSG/86, para. 20). The modifications to the current text of UN Regulation No. 58 are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2012–2016 (ECE/TRANS/224, para. 94 and ECE/TRANS/2012/12, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

I. Proposal

Table of contents, list of Annexes, insert references to new Annexes 6 and 7, to read:

"Annex 6 - Specific vehicles

"Annex 7 - Requirements for different vehicle categories"

Paragraph 1.2.3., shall be deleted.

Insert new paragraph 1.3., to read:

"1.3. **Vehicles where any RUPD (e.g. fixed, removable, foldable, adjustable, etc.) is incompatible with their use on traffic roads may be partly or fully exempted from this Regulation, subject to the decision of the Type Approval Authority.**"

Insert new paragraph 2.4., to read:

"2.4. **Any vehicle of category G will be deemed to satisfy the condition for the ground clearance set out above if the departure angle (ISO 612:1978) does not exceed:**

- (i) **10° for vehicles of categories M₁G and N₁G;**
- (ii) **20° for vehicles of categories M₂G and N₂G; and**
- (iii) **25° for vehicles of categories M₃G and N₃G.**

over a width which is not shorter than that of the rear axle by more than 100 mm on either side (excluding any bulging of the tyres close to the ground).

Where there is more than one rear axle, the width to be considered is that of the widest. The requirements of subparagraphs (i) to (iii) of this paragraph shall be satisfied at least on a line:

- (a) **at a distance of not more than 450 mm from the rear extremity of the vehicle;**
- (b) **that may have interruptions summing up in not more than 200 mm."**

Paragraph 6.2., amend to read:

"6.2. An approval number shall be assigned to each type approved. Its first two digits (at present **03** corresponding to the **03** series of amendments) shall indicate the series of amendments incorporating ..."

Paragraphs 7.1. and 7.2., amend to read:

"7.1. ~~The section height of the cross member must not be less than 100 mm. The~~ **cross-member shall have a section height of at least 120 mm.** The lateral extremities of the cross-member **shall** not bend ... less than 2.5 mm.

RUPD intended to be fitted on vehicles of categories M, N₁, N₂ with a gross vehicle weight not exceeding 8 t, O₁, O₂, on vehicles of category G and on vehicles fitted with a platform lift, the cross-member shall have a section height of at least 100 mm."

7.2. The RUPD may be so designed to have several positions at the rear of the vehicle. In this event, there **shall** be a ... operator to vary the position of the device **shall** not exceed 40 daN.

For RUPD that are designed to have several positions at the rear of the vehicle, a label shall be provided either with (a) symbol(s) or in the language(s) of the country where the device is sold to inform the operator about the standard position of the RUPD to offer effective protection against under-running.

Label minimum size: 60 x 120 mm"

Paragraph 7.3., amend to read:

"7.3. The RUPD **shall** offer communication (Annex 1, item 8)."

Paragraph 7.4.2., amend to read:

"7.4.2. The individual elements of the under run protection, including those outboard of the lift mechanism, where provided, **shall** have an effective surface area, in each case, of at least ~~350~~ **420** cm²."

Insert new paragraph 7.4.3. and 7.4.4., to read:

"**7.4.3.** For cross-members with a section height of less than 120 mm, the individual elements of the under run protection, including those outboard of the lift mechanism, where provided, shall have an effective surface area, in each case, of at least 350 cm²."

7.4.4. In the case of vehicles having a width of less than 2,000 mm and where it is impossible to achieve the requirements of paragraphs 7.4.2. and 7.4.3., the effective surface may be reduced on the condition that the resistance criteria are met."

Paragraph 15.2., amend to read:

"15.2. An approval number shall be assigned to each type approved. Its first two digits (at present **03** corresponding to the **03** series of amendments) shall indicate the series of amendments incorporating"

Insert a new paragraph 16.1., to read:

"**16.1.** For vehicles of the categories N₂ with a gross vehicle weight exceeding 8 t, N₃, O₃ and O₄, the ground clearance with respect to the underside of the protective device, even when the vehicle is unladen, shall not exceed:

- (a) 450 mm for motor vehicles and trailers with hydropneumatic, hydraulic or pneumatic suspension or a device for automatic leveling according to load. In any case, a departure angle up to 8° according to ISO 612:1978 with a maximum ground clearance of 550 mm shall be deemed to satisfy the requirements.
- (b) 500 mm or a departure angle according to ISO 612:1978 of 8°, whichever is less, for vehicles other than those in (a) above. In any case, a departure angle up to 8° according to ISO 612:1978 with a maximum ground clearance of 550 mm shall be deemed to satisfy the requirements.

This requirement applies over the entire width of the motor vehicle or trailer and shall be such that the height above the ground of the points of application of the test forces applied to the device according to Part I of this Regulation and recorded in the type approval communication form (Annex 1, item 7) does not exceed the values in the paragraphs (a) and (b) above, increased by half the minimum section height required for the cross member of the RUPD.

The height requirement for the application of the test forces shall be adjusted to the adjusted ground clearance due to the provisions for the departure angle specified above."

Paragraph 16.1. (former), renumber as paragraph 16.2. and amend to read:

"16.2. For vehicles of categories M, N₁, N₂ with a gross vehicle weight not exceeding 8 t, O₁ and O₂, the ground clearance with respect to the underside of the protective device ..."

Paragraphs 16.2. (former), renumber as paragraph 16.3.

Paragraph 16.3. (former), renumber as paragraph 16.4. and amend to read:

"16.4. For vehicles of categories M, N₁, N₂ with a GWV not exceeding 8 t, O₁ and O₂, the device shall be so fitted that the horizontal distance between the rear of the cross-member of the device and the most rearward point at the rear extremity of the vehicle, including any platform lift system mechanism, does not exceed 400 mm diminished by the largest recorded plastic and elastic deformation communication form. In measuring this distance, any part of the vehicle which is more than 2 m above the ground ~~when the vehicle is unladen~~ for every loading condition of the vehicle shall be excluded.

For vehicles of categories N₂ with a gross vehicle weight exceeding 8 t and N₃, the same requirement as above applies; however, for vehicles of these categories, the horizontal distance shall not exceed 300 mm measured at the point of the maximum section height of the cross-member according to paragraph 7.1. before the test forces are applied.

For vehicles of categories O₃ and O₄, without any platform lift system and not being designed as a tipping-trailer, the maximum horizontal distances are reduced to 200 mm before the test forces have been applied and 300 mm diminished by the largest recorded deformation (paragraph 7.3. of Part I) measured at any of the points where the test forces have been applied (Annex 1, item 8).

In any case nonstructural protrusions such as tail lamps and those of less than 50 mm of size in any direction, such as rubber bumpers, resilient buffers, hinges and latches shall be excluded from the determination of the most rearward point at the rear extremity.

Before the application of the test forces, the maximum allowed horizontal distance of a single, a segmented or an inclined cross-member of a RUPD is 100 mm between the rear of the cross-member measured at the most forward point and the rear of the cross-member measured at the most rearward point, measured in the longitudinal plane of the vehicle."

Insert a new paragraph 16.5., to read:

"16.5. The device shall be so fitted that after the application of the test forces specified in Annex 5 for vehicles of the categories N₂ with a gross vehicle weight exceeding 8 t, N₃, O₃ and O₄, the maximum ground clearance of the protective device, even when the vehicle is unladen, shall at any point not exceed:

- (a) 510 mm for motor vehicles and trailers with hydropneumatic, hydraulic or pneumatic suspension or with a device for automatic levelling according to load; and**

- (b) **560 mm for vehicles other than those listed in subparagraph (a) above.**"

Paragraph 16.4. (former), renumber as paragraph 16.6.

Insert a new paragraph 16.7., to read:

- "**16.7. Given the provisions of paragraph 7.2. for adjustable RUPD the label shall be placed clearly and permanently visible at the rear area of the vehicle next to the RUPD, at a location, which is easily visible.**"

Paragraph 24.2., amend to read:

- "**24.2. An approval number shall be assigned to each type approved. Its first two digits (at present 03 corresponding to the 03 series of amendments) shall indicate the series of amendments ...**"

Paragraph 25.1., amend to read:

- "**25.1. For vehicles of the categories N₂ with a gross vehicle weight exceeding 8 t, N₃, O₃ and O₄, the ground clearance with respect to the underside of the RUP, even when the vehicle is unladen, ~~must not exceed 550 mm over its entire width~~ shall not exceed:**
- (a) **450 mm for motor vehicles and trailers with hydropneumatic, hydraulic or pneumatic suspension or a device for automatic leveling according to load. In any case a departure angle up to 8° according to ISO 612:1978 with a maximum ground clearance of 550 mm shall be deemed to satisfy the requirements.**
 - (b) **500 mm or a departure angle according to ISO 612:1978 of 8°, whichever is less, for vehicles other than those in (a) above. In any case a departure angle up to 8° according to ISO 612:1978 with a maximum ground clearance of 550 mm shall be deemed to satisfy the requirements.**

This requirement applies over the entire width of the motor vehicle or trailer and shall be such that the height above the ground of the points of application of the test forces applied to the device according to Part I of this Regulation and recorded in the type approval communication form (Annex 1, item 7) does not exceed the values in subparagraphs (a) and (b) above, increased by half the minimum section height required for the cross member of the RUPD.

The height requirement for the application of the test forces shall be adjusted to the adjusted ground clearance due to the provisions for the departure angle specified above."

Insert a new paragraph 25.2., to read:

- "**25.2. For vehicles of categories M, N₁, N₂ with a gross vehicle weight not exceeding 8 t, O₁ and O₂, the ground clearance with respect to the underside of the protective device, even when the vehicle is unladen, shall not exceed 550 mm over its entire width and shall be such that the height above the ground of the points of application of the test forces to the RUP does not exceed 600 mm.**"

Paragraph 25.2. (former), renumber as paragraph 25.3. and amend to read:

- "**25.3. For vehicles of categories M, N₁, N₂ with a gross vehicle weight not exceeding 8 t, O₁ and O₂, the RUP shall be situated as close to the rear of the vehicle as possible. The maximum horizontal distance between the rear of the device and the most rearward point at the rear extremity of**

the vehicle, including any platform lift system, does not exceed 400 mm measured at the point of the maximum section height of the cross-member according to paragraph 25.4. after the test forces have been applied.

For vehicles of categories N₂ with a gross vehicle weight exceeding 8 t and N₃, the same requirement as above applies; however, for vehicles of these categories, the horizontal distance shall not exceed 300 mm measured at the point of the maximum section height of the cross-member according to paragraph 7.1. before the test forces are applied.

For RUP for vehicles of categories O₃ and O₄, without any platform lift system and not being designed as a tipping-trailer, the maximum horizontal distance is reduced to 200 mm before and 300 mm after the test forces have been applied.

In any case nonstructural protrusions such as tail lamps and those of less than 50 mm of size in any direction, such as rubber bumpers, resilient buffers, hinges and latches shall be excluded from the determination of the most rearward point at the rear extremity.

Before the application of the test forces the maximum allowed horizontal distance of a single, a segmented or an inclined cross-member of a RUPD is 100 mm between the rear of the cross-member measured at the most forward point and the rear of the cross-member measured at the most rearward point, measured in the longitudinal plane of the vehicle."

Paragraph 25.3. (former), renumber as paragraph 25.4.

Paragraphs 25.4. to 25.6. (former), renumber as paragraphs 25.5. to 25.7. and amend to read:

"25.5. ~~The section height of the RUP must not be less than 100 mm.~~ **The cross-member shall have a section height of at least 120 mm.** The lateral extremities of the cross-member shall not bend than 2.5 mm.

For vehicles of the categories M, N₁, N₂ with a GWV not exceeding 7.5 t, O₁, O₂, vehicles of category G and vehicles fitted with a platform lift, the cross-member shall have a section height of at least 100 mm.

25.6. The RUP may be so designed to have several positions at the rear of the vehicle. In this event, there shall be position of the RUP shall not exceed 40 daN.

For RUP that are designed to have several positions at the rear of the vehicle a label shall be provided in the language(s) of the country where the device is sold.

Label minimum size: 60 x 120 mm

The label shall be placed clearly and permanently visible at the rear area of the vehicle next to the RUP to inform the operator about the standard position of the RUP to offer effective protection against under-running."

25.7. The RUP shall offer RUP and the **most rearward point at the rear extremity of the vehicle, including any platform lift system mechanism**, does not exceed more than 2 m above the ground when the vehicle is unladen shall be excluded.

After applying the test forces specified in Annex 5 for vehicles of the categories N₂, N₃, O₃ and O₄, the maximum ground clearance of the

protective device, even when the vehicle is unladen, shall at any point not exceed:

- (a) **510 mm for motor vehicles and trailers with hydropneumatic, hydraulic or pneumatic suspension or with a device for automatic levelling according to load; and**
- (b) **560 mm for vehicles other than those listed in subparagraph (a) above."**

Paragraphs 25.7. to 25.8.1. (former), renumber as paragraphs 25.8. to 25.9.1.

Paragraph 25.8.2. (former), renumber as paragraph 25.9.2. and amend to read:

"25.9.2. The individual elements of the underrun protection, including those outboard of the lift ~~system mechanism~~, where provided, **shall** have an effective surface area, in each case, of at least ~~350 cm²~~ **420 cm²**.

~~However, in the case of vehicles having a width of less than 2,000 mm and where it is impossible to achieve the above requirement, the effective surface may be reduced on the condition that the resistance criteria are met."~~

Insert new paragraphs 25.9.3. and 25.9.4, to read:

"25.9.3. **For cross-members with a section height of less than 120 mm, the individual elements of the under run protection, including those outboard of the lift mechanism, where provided, shall have an effective surface area, in each case, of at least 350 cm².**

25.9.4. **In the case of vehicles having a width of less than 2,000 mm and where it is impossible to achieve the requirements of paragraphs 25.9.2. and 25.9.3. above, the effective surface may be reduced on the condition that the resistance criteria are met."**

Paragraphs 31.1. to 31.5., amend to read:

"31.1. As from the official date of entry into force of the **03** series of amendments, no Contracting Party applying this Regulation ~~shall~~:

- (a) **Shall** refuse ... as amended by the **03** series of amendments;
- (b) **Shall** refuse ... as amended by the **03** series of amendments;
- (c) **May** prohibit ... as amended by the **03** series of amendments.

31.2. ~~Until 18 months after the date of entry into force of this Regulation as amended by the 02-03 series of amendments, Contracting Parties applying this Regulation shall:~~

- (a) ... as amended by the **02** series of amendments;
- (b) ... as amended by the **02** series of amendments;
- (c) ... as amended by the **02** series of amendments;
- (d) ... as amended by the **02** series of amendments.

31.3. ~~Starting 18 months after the date of entry into force of this Regulation as amended by the 02 series of amendments, Contracting Parties applying this Regulation:~~

- (a) **May** refuse ... as amended by the **03** series of amendments;
- (b) **Shall** grant ... as amended by the **03** series of amendments;

- (c) May prohibit ... as amended by the **03** series of amendments.
- 31.4. Until **1 September 2018** ~~48 months following the date of entry into force of this Regulation as amended by the 02 series of amendments~~, Contracting Parties applying this Regulation shall:
 - (a) Continue to grant ... as amended by the **02** series of amendments;
 - (b) Continue to accept ... as amended by the **02** series of amendments.
- 31.5. **As from 1 September 2020** ~~As from 48 months after the date of entry into force of this Regulation as amended by the 02 series of amendments~~, Contracting Parties applying this Regulation:
 - (a) Shall grant ... as amended by the **03** series of amendments;
 - (b) May refuse national ... as amended by the **03** series of amendments."

Annex 1, the communication form,

Item 6., amend to read:

"6. Test conducted on ~~a rigid bench/on~~ a vehicle/on a representative part of the chassis of a vehicle 2/"

Item 8. of the communication form, amend to read:

"8. Maximum horizontal **and vertical** deflection observed during and after the application of the test forces in Annex 5....."

Item 9. of the communication form, amend to read:

"9. ~~Vehicles on which the device may be installed (if applicable)~~

Restrictions on application

a. Vehicles on which the device may be installed (if applicable)

b. Characteristics of the chassis to which the device may be installed (e.g. stiffness, profile dimensions, ...) (if applicable)"

Item 20. of the communication form, amend to read:

"20. The following documents, bearing the approval number shown above, are available upon request:

drawings, diagrams and layout plans of the components of the structure considered to be of importance for the purposes of this Regulation;

detailed information about the devices representing the vehicle structures used for the mounting of the RUPD (e.g. moment of inertia of the beams);

where applicable drawings of the protective devices and their position on the vehicle."

Annex 4, through the text and figures of the annex, replace figures "02" by "03" (5 times).

Annex 5,

Paragraph 1.1.3., shall be deleted.

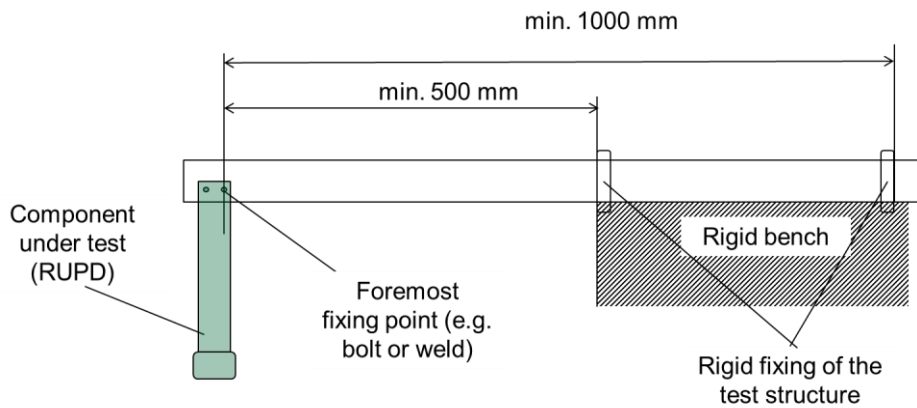
Paragraph 1.2., amend to read (including a new Figure 1):

"1.2. In the case of paragraphs 1.1.2., ~~and 1.1.3~~ the parts of the vehicle chassis ~~or to the rigid test bench~~ shall be on the vehicle. **The part of**

the chassis can be fixed on a test bench as shown in Figure 1, representing the minimum requirements to be fulfilled. The structures used as side rails shall be representative of the chassis of vehicles for which the underrun protection system is intended.

The distance of the foremost fixing point of the RUPD from the rigid test bench shall not be less than 500 mm. If a diagonal strut is used to support the RUPD, this distance shall be measured between the foremost fixing point of the strut to the side rail structures and the rigid test bench.

Figure 1



Paragraph 1.3., amend to read:

"1.3. At the request by calculation.

The mathematical model shall be validated in comparison with the actual test conditions. To that effect, a physical test shall be conducted for the purposes of comparing the results obtained when using the mathematical model with the results of a physical test. Comparability of the test results shall be proven. A validation report shall be drafted by the manufacturer or by the technical service and submitted to the approval authority.

Any change made to the mathematical model or to the software likely to invalidate the validation report shall be brought to the attention of the approval authority which may require a new validation process to be conducted."

Insert new paragraph 1.4., to read:

"1.4. **In case of a RUPD where the cross-member does not have a vertical flat surface of at least 50 per cent of the minimum section height of the cross-member according to paragraph 7.1. or 25.5. of this Regulation at the height of the points of application of the test forces according to paragraph 16.1. or 25.1., the manufacturer shall supply the Technical Service with a device that allows the application of horizontal test loads on the cross-member with the test equipment used by the Technical Service. The device shall not modify the dimensional and mechanical characteristics of the RUPD or increase its resistance during test. The device shall neither be rigidly fixed to the RUPD nor to the test equipment."**

Paragraphs 3.1. to 3.1.3., amend to read:

"3.1. The requirements of paragraphs 7.3. and 25.7.6 of this Regulation shall be verified by means of suitable test mandrels; the forces for tests prescribed in paragraphs 3.1.1. and 3.1.2. below shall be applied separately and consecutively, via a surface not more than 250 mm in height (**but covering the maximum section height of the cross-member or RUP**, the exact height shall be indicated by at the vertical edges. **The RUP shall offer adequate resistance to forces applied parallel to the longitudinal axis of the vehicle. The surface shall not be rigidly fixed to the RUPD or to the RUP and shall be articulated in all directions.** The height above the ground of the centre of the surface shall be defined by on a vehicle the height shall not, however, exceed ~~600 mm~~ **the height as specified in paragraphs 16.1. and 16.2. or as specified in paragraphs 25.1. and 25.2. of this Regulation** when the vehicle is unladen. The order in which the forces are applied may be specified by the manufacturer.

The device used to distribute the test force over the stated flat surface shall be connected to the force actuator through a swivel joint. The arrangement of the force actuator, whether pulling or pushing, shall be arranged such that it does not add any stiffness or stability to the underrun protection system structure, i.e. it shall neither increase the instability threshold force nor decrease the maximum deflection of the underrun protection system."

3.1.1. A horizontal force of ~~100-180~~ **85** per cent of the force by the manufacturer.

3.1.2. In the cases defined in paragraphs 1.1.1. and 1.1.2. of this annex a horizontal force of ~~50-100~~ **50** per cent of the force generated by the maximum mass of the vehicle, whichever is the lesser, shall be applied consecutively to two points located 300 + 25 mm from the longitudinal planes tangential to the outer edges of the wheels on the rear axle or of the RUPD, if it exceeds the width of the rear axle, and to a third point located on the line joining these two points, in the median vertical plane of the vehicle.

3.1.3. **Upon request of the manufacturer the force levels can be reduced to [80] per cent of the requirement given in paragraphs 3.1.1. to 3.1.2. for the vehicles listed in Annex 6."**

Insert new paragraph 3.1.4., to read:

"3.1.4. **Upon request of the manufacturer the force levels can be reduced to [80] per cent of the requirement given in paragraphs 3.1.1. to 3.1.2. for the vehicles listed in Annex 6."**

Insert a new Annex 6, to read:

"Annex 6

Specific vehicles

1. Specific types of vehicles
- 1.1. Vehicles with tipping-bodies;
- 1.2. Vehicles fitted with a platform lift at the rear."

Insert a new Annex 7, to read:

"Annex 7

Requirements for different vehicle categories

Vehicle category or type of vehicle	Geometry referred to in paragraph			Test force referred to in paragraph(s):
	Section height	Ground clearance before the test	Horizontal distance between the rear of the RUPD and the rear of the vehicle	
M, N ₁ , N ₂ with a GVW* < 8 t, O ₁ ,	2.3./2.4./ 7.1./25.5.	2.3./2.4./ 16.2./25.2.	2.3./2.4./ 16.4./25.3.	2.3./ 2.4./ A5/3.1.1. to 3.1.2.
N ₂ with a GVW > 8 t, N ₃	7.1. or 25.5.	16.1./16.2. or 25.1./25.2.	16.4. or 25.3.	A5/3.1.1. to 3.1.2.
O ₃ , O ₄	7.1. or 25.5.	16.1./16.2. or 25.1./25.2.	16.4. or 25.3.	A5/3.1.1. to 3.1.2.
Specific Vehicles (see Annex 6)	7.1. or 25.5.	16.1./16.2. or 25.1./25.2.	16.4. or 25.3.	A5/3.1.3.

Note: A reference such as A5/3.1.1. in the table indicates the annex (Annex 5) and paragraph (3.1.1.) of that annex, where the relevant vehicle or requirement is described and specified. A reference such as 2.3. in the table indicates paragraph (2.3.) of this Regulation, where the relevant requirement is specified.

* GVW means Gross Vehicle Weight."

II. Justification

A detailed justification for the proposed amendments was provided at the 105th session of GRSG in informal document GRSG-105-23.